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DESCRIPTIONS OF NEW MICROLEPIDOPTERA OF FOREST  
TREES.<sup>1</sup>

(With Plates VII and VIII)

By AUGUST BUSCK, *Bureau of Entomology.*

**Sesia brunneri** n. sp.

Labial palpi orange red with a broad black lateral streak exteriorly. Face dark metallic blue. Head deep black. Antennæ bluish black. Collar metallic blue. Thorax bluish black with the anterior sides sprinkled with red and with patagia dark orange red. Forewings alike in both sexes, transparent with broad purplish blue edges and a broad, perpendicular streak at the end of the cell; extreme costal edge narrowly orange; underside of the apical and especially of the costal edging sprinkled with orange red. Hindwings transparent, with narrow blackish blue edges and veins; costal edge dusted with red, especially on the underside. Abdomen dark metallic blue with distinct, red, transverse streaks on second and on fourth segments and sometimes with traces of red also between the other segments. Anal tuft with dark metallic blue center, edged with brick red; under side red. Legs dark metallic blue, liberally sprinkled and banded with red; tarsi blue. Alar expanse: male, 24-25 mm.; female, 26-27 mm.

*Foodplant:* *Pinus ponderosa.*

*Habitat:* Camas, Montana, Josef Brunner, collector.

*Type:* Cat. No. 18238, U. S. N. M.

This species is named in honor of Mr. Brunner whose observations of the life history enabled the differentiation of this species from the very similar *Sesia novarænsis* Hy. Edw., which lives in Douglas fir.

This species differs from the somewhat more robust *Sesia novarænsis* in the blue, not black, ground color and in the much less extensive red abdominal coloration.

<sup>1</sup> Presented at meeting of April 2, 1914.

*Sesia picea* Dyar, a third species of this group may be differentiated by the entirely black abdomen.

***Recurvaria milleri* n. sp.**

Labial palpi white, second joint with two black bars externally; terminal joint with an incomplete black annulation at base. Antennæ white annulated with black. Face white. Head white sparsely sprinkled with dark fuscous. Thorax white strongly suffused with dark fuscous. Forewings white, strongly and irregularly suffused with black, especially on costal and apical parts; a large, poorly defined, black spot on costa beyond the middle and a smaller one just before the middle; opposite the former is an even less well defined dorsal black spot; four small tufts of raised black scales, one on the middle of the cell, one at the end of the cell and two below these on the fold; scattered black dots around apical edge; all of the black markings are fugitive and easily lost in flown specimens. Cilia ochreous white, dusted with black. Hindwings whitish fuscous; cilia slightly ochreous. Abdomen silvery white with a large, bluish black poorly defined spot on the upper side and shaded with black on the under side; the males have a large, conspicuous, ochreous hair pencil on thorax underneath the base of the hindwings. Legs white, barred and annulated with black. Alar expanse: 12-15 mm.

*Habitat:* Yosemite National Park, California, John M. Miller, collector.

*Foodplant:* *Pinus murrayana*.

*Type:* Cat. No. 18438, U. S. N. M.,

The species is named in honor of the collector. The larva is a needle miner like that of *Recurvaria pinella* Busck, in Colorado, and that of *Paratechia pinifoliella* Chambers, in the East.

Mr. Miller found this species exceedingly abundant, in the larval state, on June 26. From a shipment of needles from him, received on July 16, about a hundred moths issued en route and many more the following days.

***Evetria bushnelli* n. sp.**

Labial palpi whitish dusted with fuscous; terminal joint fuscous. Face and head white, strongly mottled with fuscous, each scale being white at base and tip, with a dark fuscous median part. Antennæ white, irregularly annulated with dark brown. Thorax light gray, mottled with white and fuscous; base of patagia light reddish brown. Forewing deep reddish brown graduating into light ochreous on outer two-thirds of dorsal part of the wing. A blunt, triangular, ochreous spur runs up into the costal darker color. Beyond the cell and on apical third of dorsum is a small round spot of the dark brown ground color. Entire basal third of the wing brown with a superimposed, poorly defined, transverse fascia of silvery iridescent scales. At basal third, terminating this basal area is a broad, straight, transverse fascia of silvery or hyaline scales. This fascia begins in the

costal edge in two, small, indistinct, geminate, white streaks. From two similar costal streaks just beyond the middle of the wing runs a narrow, outwardly angulated, fascia of shiny hyaline scales across the wing. At apical third is a similar, but nearly straight, transverse fascia. The two latter fasciæ contain on the middle of the wing a few black scales. Before the apex are two small, silvery, costal streaks and the terminal edge is rather broadly suffused with similar silvery scales. All of the silvery markings appear to be slightly raised. Cilia bluish white with two transverse, blackish lines. Hindwing light fuscous; cilia whitish with a fuscous basal line. Abdomen silvery fuscous. Legs silvery fuscous; tarsi with indistinct, blackish brown annulations. Alar expanse: 12-19 mm.

*Habitat:* Fort Bayard, New Mexico, G. E. Bushnell, collector.

*Foodplant:* *Pinus ponderosa* and other pines.

*Type:* Cat. No. 18439, U. S. N. M.

This species is named in honor of the collector, Colonel G. E. Bushnell, to whom is due credit for all the information we have on its biology.

The larvæ feed gregariously in the terminal twigs of *Pinus ponderosa* and other pines and appear to be severely injurious to these trees.

The full grown larva is 14 mm. long; body of a reddish yellow color; tubercles not distinguishable; hairs short, white. Head light yellowish brown with black eyespots; thoracic shield small, darker brown. Feet normal, abdominal feet small with a single, complete circlet of uniform hooks.

The moths from overwintering pupæ produce an early summer generation, the adults of which issue about July first.

The species, which may have been introduced into New Mexico with the trees, is very close to the eastern *Evetria frustrana* Comstock, but averages considerably larger and differs in the details of ornamentation, and in the character of its work. It is the same species which for several years has been excessively injurious to the pine plantations of the U. S. Forest Service at Halsey, Nebraska. (See Forestry Quarterly, Dec. 1910.)

*Evetria virginiana* n. sp.

Labial palpi, face and head light whitish yellow. Antennæ reddish white with a thin, longitudinal, black line anteriorly. Thorax reddish brown, with a central transverse band suffused with white scales and with the posterior tip and the tips of the patagia white. Forewings broad and ample, rich reddish brown with a number of irregular, pearly white, transverse, forked and anastomizing lines with violet sheen, which terminate in five small, geminate, white costal streaks. The narrow areas surrounded by these transverse lines are of a somewhat lighter yellowish brown. This is particularly the case with one on the middle of the wing and one near tor-

nus. Cilia whitish brown. Hindwing very light, nearly white, slightly suffused with brown, especially toward tip; cilia white. Abdomen light brown, each joint edged with white. Legs white, suffused with brown; anterior tibiae reddish brown. Alar expanse: 23 mm.

*Foodplant:* *Pinus virginiana*.

*Habitat:* Falls Church, Virginia. Reared by Carl Heinrich.

*Type:* Cat. No. 19036, U. S. N. M.

A very distinct, large, broadwinged species, nearest to *E. comstockiana* Fernald, but larger, more simple in its pattern, with darker thorax and more whitish hindwings. The species feeds in the young branches of *Pinus virginiana* and makes a large globular pitch-nodule (pl. VII, fig. 1), from which the imago issues early in May.

***Evetria taxifoliella* n. sp.**

Labial palpi brown, mottled with fuscous. Terminal joint blackish. Face, head and thorax black, liberally dusted with white. Forewings grayish brown, transversely striated with white and black atoms, at basal third there is a poorly defined, dark brown, black edged, zigzag band across the wing, followed by a light gray and white area. Through the middle of the wing from the base runs a poorly defined, brown streak, enlarged into an irregular blotch at the end of the cell. On the costal edge there is a series of blackish spots with white dusted intervals, at tornus an oval, white, black dusted spot, with a short perpendicular, black line in the center. Apical and terminal edge dark golden brown with a black line along the extreme edge before the dark fuscous cilia. Hindwing blackish fuscous. Abdomen dark fuscous. Legs fuscous; anterior tarsi annulated with black. Alar expanse: 13-14 mm.

*Habitat:* Missoula, Montana, Josef Brunner, collector.

*Foodplant:* *Pseudotsuga taxifolia*. Reared by Mr. Brunner from cones.

*Type:* Cat. No. 18440, U. S. N. M.

This species is nearest and very similar to *Evetria siskiyouana*, Kearfott, but is only about half the size of that form.

***Evetria metallica* n. sp.**

Second joint of labial palpi dirty white sprinkled exteriorly with black; terminal joints blackish fuscous. Face, head, and thorax bluish fuscous irrorated with white, each scale being tipped with dirty white so as to produce a rather light gray effect. Forewing strongly overlaid with bluish metallic scales in many broad, transverse, wavy lines, the intervals between the metallic scaling is rich dark brown liberally sprinkled with black scales. The metallic lines on the outer half of the wing originate in small whitish geminate costal spots. Cilia dark blue, whitish at the base and with a dark basal line. Hind wing dark fuscous. Abdomen dark blue, each joint broadly tipped with silvery fuscous; anal tuft silvery with blue center.

Legs dark silvery fuscous; tarsal joints with narrow dirty white annulations. Alar expanse: 20 mm.

*Habitat:* Missoula, Montana, Josef Brunner, collector.

*Type:* Cat. No. 18443.

The following note is by Mr. Brunner: "Larvæ on yellow pine, *Pinus ponderosa*, on which it makes a pitch tube on tip branchlets. Pupated April second, imago issued May seventh."

***Evetria montana* n. sp.**

Labial palpi dark fuscous mixed with reddish brown exteriorly. Face and head light reddish ochreous. Thorax dark fuscous; base of patagia reddish brown. Forewings dark fuscous; base, a broad, transverse fascia just before the middle of the wing, and a narrower fascia beyond the middle, irrorated with white, each scale being broadly white-tipped. Outer half of the wing overlaid with brown and brownish ochreous and violaceous scales, more intensely so towards the very oblique terminal edge. Cilia fuscous, tipped with red. Hindwings shiny dark fuscous with lighter cilia. Abdomen and legs dark fuscous; tarsal joints with narrow, lighter annulations. Alar expanse: 20 mm.

*Habitat:* Elliston, Montana, Josef Brunner, collector.

*Foodplant:* *Pinus contorta*.

*Type:* Cat. No. 18442, U. S. N. M.

The following note is by Mr. Brunner: "The larva is found in buds which would be the terminals the succeeding season if not infested and destroyed by this insect. Adult moth issued in captivity December 10, from larva collected July 29."

The species is nearest and very similar to *E. neomexicana* Dyar, which, however, differs in the more uniform coloration of both the basal and apical part of the wing, and by having a longitudinal black streak to the middle of the termen.

***Evetria albicapitana* n. sp.**

Labial palpi ochreous white, second joint shaded externally with light reddish brown; terminal joint sprinkled with black. Face and head white. Antennæ gray with narrow black annulations. Thorax reddish gray with a reddish brown, transverse band and with brown posterior tip. Patagia light reddish brown. Forewing light reddish brown with sparse black dusting and with silvery metallic cross-lines. Extreme costal edge blackish with three small, geminate, white spots on basal half and with four similar white spots on outer half; from each of these geminate costal spots originates a broken, transverse, silvery line which runs in an irregular zigzag course across the wing, without, however, reaching the dorsal edge. The three basal lines run in an outwardly oblique direction and nearly unite on the fold; the fourth line is quite short and leaves a large circle at the end of the cell without metallic scales; the fifth silvery line is nearly transverse and straight with but a single small interruption. Three, small,

yellowish white dashes on the terminal edge. Cilia gray with a black basal line. Hindwing dark fuscous with whitish cilia. Abdomen dark fuscous, each joint edged with white. Male claspers very large, covered on the outside with whitish scales, on the inside with long light brown hairs. Legs silvery white with broad blue bars and annulations. Alar expanse: 16-19 mm.

*Habitat:* MacDowell, Saskatchewan, Canada, J. C. Blumer, collector; Boulder Junction, Wisconsin, S. A. Rohwer, collector.

*Foodplant:* *Pinus divaricata*.

*Type:* Cat. No. 18444, U. S. N. M.

The larvæ bore in the young branches and make small, round resin nodes about two-thirds of an inch in diameter, (pl. VII, fig. 2). When full-grown the larva is about one-half inch long, of reddish color with a light brown head and thoracic shield; tubercles small, shiny.

Imago issued in captivity at Falls Church, Virginia, in early March, undoubtedly considerably earlier than is the case in nature.

***Swammerdamia castaneæ* n. sp.**

Labial palpi dark fuscous with base and extreme tip white. Face and head white. Antennæ dark fuscous annulated with white and with white basal joint. Thorax white, sometimes slightly dusted with fuscous and with posterior tip suffused with fuscous. Forewings dark fuscous with strong bluish sheen, irregularly sprinkled with white and black scales, the latter tending to form indistinct, interrupted rows of black dots; a blackish costal dash just above apex; apical edge and cilia strongly dark golden cupreous. Hindwings dark fuscous; cilia lighter ochreous fuscous. Abdomen dark fuscous with ochreous anal tuft. Legs fuscous, tarsi annulated with white. Alar expanse: 11-12 mm.

*Habitat:* East River, Connecticut, Chas. R. Ely, collector, and Charter Oak, Pennsylvania, W. S. Fisher, collector.

*Foodplant:* *Castanea dentata*.

*Type:* Cat. No. 18441, U. S. N. M.

The species is close to the European *S. pyrella* and was wrongly identified by the writer as that species from New Hampshire (Proc. Ent. Soc. Wash. XIII, p. 80, 1911), but is somewhat larger and at once distinguishable by the white thorax.

The following are Dr. Ely's notes, which he with his usual liberality has asked me to utilize:

"Larva green, 10 mm. long. Forms a very loose, open web, much like that of a spider, on the upper side of chestnut leaf. The larva appears to the naked eye to be marked by transverse bands of darker green by reason of the darker shade at the points of the segments. Each segment has an indistinct dorsal streak

darker than the ground color. The tubercles are very dark surrounded by pale yellowish. The first two tubercles on the side of each segment are in a line, thus giving the appearance of a narrow, broken, subdorsal band. The head is yellowish and the cervical shield is pale spotted with the same color as the abdominal tubercles. The first larva spun its cocoon by July 17. The cocoon is white, silky, spindle-shaped and is suspended within the web. The larva eats off the tip of the leaf under the web. Adults emerged August 6."

*Ectœdemia heinrichi* n. sp.

Face and head deep black; mouthparts yellowish; antennal eye-caps large, creamy white; remainder of the antennæ black with narrow yellow annulations. Thorax light yellow sprinkled with black scales. Forewings light ochreous profusely and irregularly sprinkled with blackish fuscous scales; there are two, faint, poorly defined transverse fasciæ on which the dark scaling is less pronounced, one at basal third and one at apical third. Apical cilia creamy white with a black basal line. Hindwing and underside of all wings dark steely fuscous; cilia yellowish. Abdomen dark yellowish fuscous, underside silvery. Legs golden yellow, posterior tibiæ with strong golden spines above. Alar expanse: 9-10 mm.

*Habitat*: Falls Church, Virginia.

*Foodplant*: *Quercus palustris*.

*Type*: Cat. No. 19039, U. S. N. M.

Named in honor of my friend and assistant Carl Heinrich, who has ascertained the life history of this interesting species, which makes a characteristic mine in the bark of young branches of *Quercus palustris*. The mine is a narrow linear track, winding closely upon itself in an oval spiral much like a compressed watch spring, and showing very plainly in the bark (fig. 4). Old work cracks and leaves the inner bark exposed. The work was found only in this species of oak and mostly in the young saplings, although a few mines were found on the outer branches of larger trees.

The larva is very similar to *Ectœdemia castanea* Busck, but rather larger and with more pronounced ventral processes. These larvæ become mature in late fall and were observed leaving their mines from October 24 to November 5; they fall to the ground and spin a small reddish brown, oval, flattened cocoon 2-2½ mm. broad and 3-4 mm. long; forced cocoons yielded moths in the latter part of March.

The imagoes are very near to *E. obrutella* Zeller, but with much darker dusting and with darker hindwings.

## EXPLANATION OF PLATES.

PLATE VII. Fig. 1, pitch nodule on *Pinus virginiana* caused by *Evetria virginiana* Busck; fig. 2, pitch nodules on *Pinus divaricata* caused by *Evetria albicapitana* Busck.

PLATE VIII. Fig. 3, chestnut leaves injured by *Eucosma haracana* Kearfott; fig. 4, twigs of *Quercus palustris* showing spiral mines of *Ectædemia heinrichi*, Busck.

LIFE HISTORY OF EUCOSMA HARACANA KEARFOTT.<sup>1</sup>

BY AUGUST BUSCK, *Bureau of Entomology.*

*Protopteryx haracana* Kearfott, Trans. Am. Ent. Soc. Phila., vol. 33, p. 44, 1907.

*Protopteryx resoluta* Meyrick, Ent. Mo. Mag., vol. 23, p. 34, 1912.

During May and early June many leaves of the chestnut in the vicinity of Washington, D. C., are found to be rolled inwards and downwards, as shown in the accompanying photograph, (pl. VIII, fig. 3). These very common and conspicuous rolls are produced by the larvæ of the above species, the life-history of which has hitherto been unknown.

The young larvæ of this species are yellowish white with jet black head and thoracic shield and with black thoracic feet; tubercles small and inconspicuous, hardly darker than the rest of the body and with short white hairs; prolegs normal with a complete circle of small hooks. The full grown larvæ have light yellow head with black eyespots, yellow thoracic shield and feet; length 14 mm. When full grown the larvæ leave the rolls and let themselves down to the ground, into which they burrow and make a tough, parchment-like oval cocoon, in which they remain as larvæ until late fall. In a warm room the moths began to issue early in February; outdoors under natural conditions issuance does not take place before April.